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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,710	08/07/2006	Brad A. Lovett	60,158-294PUS1	4638

26096 7590 10/21/2011

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ART UNIT	PAPER NUMBER
1782	

MAIL DATE	DELIVERY MODE
10/21/2011	PAPER

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/588,710
Filing Date: August 07, 2006
Appellant(s): LOVETT ET AL.

Stephen A. Burch
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/20/11 appealing from the Office action mailed 3/25/11.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1, 4-6, 10-13, 31-33 and 35-38 are currently rejected.

Claims 14-19, 21, 23-25 and 34 are withdrawn.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

6,428,866	Jadamus et al.	8-2002
3,538,209	Hegler	11-1970

"Encyclopedia of Polymer Science and Technology", Pallmer, R.J. ed. John Wiley & Sons, New York. 2001. Vol. 3, pgs. 618-642

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 4-6, 10-12, 31-33 and 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jadamus et al. U.S. Patent No. 6,428,866 (hereafter referred to as Jadamus) and "Encyclopedia of Polymer Science and Technology", Pallmer, R.J. ed. John Wiley & Sons, New York. 2001. Vol. 3, pgs. 618-642. (hereafter referred to as Pallmer)

3. Jadamus teaches a multilayer pipe for fuel transport applications comprising an outer layer of a thermoplastic composition and an inner layer of an electrically conductive thermoplastic composition wherein the electrically conductive composition contains graphite fibrils. (Col. 1, line 54-Col. 2, line 2) The inner and outer layers are recited to comprise polyamides such as copolyamides comprising isophthalic and terephthalic acid residues and mixed aliphatic/aromatic polycondensate polyamides such as those described in U.S. Patent No. 3,393,210 (Speck). (Col. 2, lines 20-26, 41-44, 50-51) The polyamides may be impact modified. (Col. 3, line 11) The ratio of the

thickness of the inner layer to the thickness of the outer layer is recited to be between 1:5 to 1:100 (inner layer = 17% - 1% of the total thickness) The graphite fibrils render the surface resistance of the inner layer to preferably be less than 10^5 Ω/sq. (Col. 5, lines 29-31)

4. An optional barrier layer between the inner and outer layers comprising a thermoplastic molding composition such as polyester, polyvinylidene fluoride, ETFE, polyolefin or EVOH may also be present. (Col. 5, lines 1-6) Polyamide is disclosed as an interior layer in Table 1. (Table 1) Fluoropolymers such as ethylene-cholorotrifluoroethylene (ECTFE) and polyesters such as polybutylene naphthalate are recited to be useful inner layers for the pipe disclosed. (Col. 4, lines 26-36)

5. Jadamus is silent regarding the percentage of amide groups attached to aromatic rings, corrugation of the fuel tube and the presence of a heat stabilizer.

6. Pallmer teaches that nylons (polyamides) containing aromatic monomers tend to have increased stiffness and strength by virtue of the greater rigidity of the chains. (Pg. 625)

7. Regarding claim 1: Jadamus clearly recites a vehicle tubing comprising two polyamide layers in which the inner polyamide layer is electrically conductive wherein polyamide layers that are useful for the invention include copolyamides comprising aromatic monomers. Pallmer establishes that the level of ordinary skill in the art at the time the invention was made was such that a practitioner of polymer chemistry would have recognized that the increasing the percentage of aromatic monomers present in a polyamide was a variable that produced the result of increasing the stiffness and

strength of the polyamide. Jadamus discloses that aromatic coacids such as terephthalic and isophthalic acid are useful in the production of copolyamides for the polyamide layers disclosed. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have optimized the result effective variable of the percentage of aromatic monomer present in the copolyamides useful for the invention of Jadamus in order to obtain a pipe with desirable properties of stiffness and strength. Terephthalic acid and isophthalic acid copolymerize to form a copolyamide in which the amide groups are directly attached to the aromatic ring comprising these molecules. Therefore, the optimization of the amount of terephthalic or isophthalic acid present directly correlates to the percentage of amide groups attached to aromatic rings. This obvious optimization of a result effective variable would have produced the invention claimed in claim 1.

8. Regarding claims 4, 6, 10-12 and 33: Jadamus discloses an impact modifier with the inner layer having a thickness between 50%-10% of the total thickness and being electrically conductive by means of carbon fibers with a surface resistivity between 10^2-10^7 Ω/sq claimed in claims 1, 4, 6, 10-12 and 33.

9. Regarding claims 5, 31 and 35-37: Jadamus disclose an embodiment with an additional barrier layer comprising the same materials as claimed in claims 5 and 31. Table 1 discloses the use of polyamide as an interior layer as claimed in claim 36. ECTFE and polybutylene naphthalate are both disclosed to be useful materials for the inner layer of the tubing and therefore substitution of these materials for the fluoropolymers and polyester disclosed for the barrier layer would have been obvious to

one of ordinary skill in the art at the time the invention was made because these materials were recognized to perform the equivalent function of providing barrier properties. The selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination. ("Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle." *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious)) (MPEP 2144.07) This obvious selection of a known material based on its suitability for its intended use would have produced the same inventions claimed in claims 35 and 37.

10. Regarding claim 32: The examiner takes official notice that it is universally known in the fuel hose art to provide heat stabilizers to polymers that will be employed in applications where they are exposed to high heat. Since fuel hoses are used in engines, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have added a heat stabilizer to the aromatic polyamide recited by Jadamus in order to improve the stability of the hose under the high temperature conditions it would be employed in. This obvious improvement to the invention of Jadamus would have produced the invention as claimed in claim 32.

11. It is noted by the examiner that the official notice taken by the examiner that it is universally known in the fuel hose art to provide heat stabilizers to polymers that will be employed in applications where they are exposed to high heat is taken to be admitted

prior art because applicant failed to traverse the examiner's assertion of official notice in the response to the non-final rejection filed 10/20/09, in the arguments after the final rejection filed 4/19/10, in the appeal brief filed 8/9/10 or in the appeal brief filed 9/20/11. (See MPEP 2144.03C)

12. Claims 13 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jadamus et al. U.S. Patent No. 6,428,866 (hereafter referred to as Jadamus) and "Encyclopedia of Polymer Science and Technology", Pallmer, R.J. ed. John Wiley & Sons, New York. 2001. Vol. 3, pgs. 618-642. (hereafter referred to as Pallmer) as applied to claim 1 above in further view of Hegler U.S. Patent No. 3,538,209 (hereafter referred to as Hegler).

13. Jadamus and Pallmer teach what has been recited above but is silent regarding corrugating the outer layer of the hose while the inner layer remains non-corrugated.

14. Hegler teaches a double walled plastic tube comprising a corrugated outer layer and a non-corrugated inner layer. (Col. 2, lines 17-25) Corrugation of the outside provides the tubing with flexibility while the smooth surface of the inside is beneficial for pipes through which liquid is to be pumped. (Col. 1, lines 55-62)

15. Regarding claim 13: The examiner takes official notice that it is universally known in the fuel hose art to provide corrugation to the exterior of hoses in order to increase their flexibility. It would have been obvious to one having ordinary skill in the

art at the time the invention was made to have corrugated the exterior surface of the hose disclosed by Jadamus to increase the flexibility of the hose while leaving the interior layer uncorrugated as taught by Hegler since the pipes disclosed by Jadamus are intended to have liquid pumped through them. The obvious utilization of this configuration according to the teachings and benefits known in the prior art would have produced the invention as claimed in claim 13.

16. It is noted by the examiner that the official notice taken by the examiner that it is universally known in the fuel hose art to provide corrugation to the exterior of hoses in order to increase their flexibility is taken to be admitted prior art because applicant failed to traverse the examiner's assertion of official notice in the response to the non-final rejection filed 10/20/09, in the arguments after the final rejection filed 4/19/10, in the appeal brief filed 8/9/10 or in the appeal brief filed 9/20/11. (See MPEP 2144.03C)

17. Regarding claim 38: It would have been obvious to one having ordinary skill in the art at the time the invention was made to have left areas of the tubing that were not required to be flexible uncorrugated. This would have produced a tubing with alternating corrugated and non-corrugated sections as claimed in claim 38.

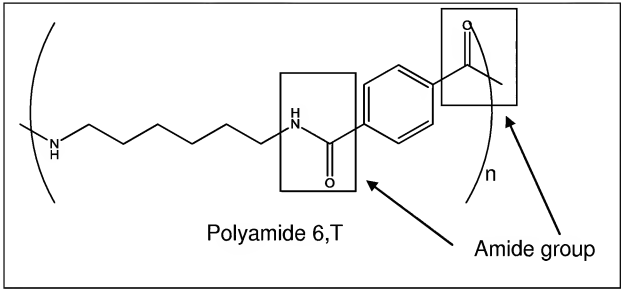
(10) Response to Argument

The Appellant asserts on page 4 of the appeal brief that "Varying the amount of aromatic polyamide present in the outer layer bears no connection to the percentage of amide groups attached to aromatic ring in the chemical structure of the polyamide itself

because the percentage of amide groups attached to aromatic rings would be the same regardless of the amount of aromatic polyamide present in the outer layer." The examiner agrees with this conclusion, however, it is not germane to the instantly pending rejection because the examiner did not rely on varying the amount of aromatic polyamide. Instead, the examiner relied on varying the amount of *aromatic monomer* (i.e. the number of aromatic monomers which are necessarily attached to amide groups within the polyamide chain comprising the aromatic copolyamide) within the aromatic copolyamide recited by Jadamus to comprise the inner and outer layers of the vehicle tubing disclosed. As such, the examiner does not find this argument persuasive.

The Appellant asserts on page 5 of the appeal brief that "Pallmer merely discloses that the presence of aromatic monomers results in an increased stiffness compared to aliphatic nylon that does not include aromatic groups. No indication is given in Pallmer as to what effect varying the levels of amide groups attached to aromatic groups would have, or even that it is known to vary such a parameter". The appellant appears to assert that the prior art must describe the feature claimed by the appellant in the same language used by the appellant. The recitation in claim 1 of "at least 50% of the amide groups are attached to aromatic rings" is inextricably related to the amount of aromatic monomer present in an aromatic copolyamide.

Polyamides are condensation polymers in which the connection between the monomers making up the polymer is an amide linkage. Amide linkages are a carbon bonded to a nitrogen atom and double bonded to an oxygen atom. Polyamides are produced either by ring opening polymerization of lactams or by the condensation of a



diamine with a dicarboxylic acid. Therefore, in a polyamide produced by condensation of a diamine with a dicarboxylic acid, the groups derived from the diamine and the groups derived from the dicarboxylic acid always alternate in the polymer chain. For example, Jadamus discloses that polyamide 6 is a suitable polyamide for the pipe of the invention and that when copolyamides are used they may comprise coacids such as terephthalic acid. Therefore, Jadamus reasonably discloses polyamide 6,T which is a copolyamide of hexamethylene diamine and terephthalic acid. Since the diamine and dicarboxylic acid have to alternate in a copolyamide derived from a diamine and a dicarboxylic acid, in polyamide 6,T **every** amide group is attached to an aromatic group as can be seen in the illustrative figure above. Therefore, the disclosure of Jadamus implicitly discloses polyamides in which every amide group is attached to an aromatic ring.

It is noted by the examiner that the only examples of polyamides comprising aromatic groups provided by the appellant are polythalamide (i.e. polyamide 6,T) and

polyamide 9,T. (Pg. 4, lines 10-15 of appellant's specification). In each of these polyamides, *all* of the amide groups are attached to aromatic rings because these polyamides are produced from the condensation of a diamine and a dicarboxylic acid.

Nonetheless, the examiner has further provided the teachings of Pallmer to establish that it was known to those of ordinary skill in the art that aromatic monomers increase the stiffness of polyamides by virtue of the greater rigidity of the polyamide chains. The appellant has not disputed the assertion by the examiner that increasing the amount of aromatic monomer would increase the stiffness of a polyamide composition only that that Pallmer fails to disclose the effect of the amount of amides attached to aromatic rings. Jadamus discloses aliphatic copolyamides such as polyamide 6,6 and that these copolyamides may further comprise coacids such as terephthalic acid. In the polymer chain of copolyamides such as these, the diamine group is hexamethylene diamine which alternates with dicarboxylic acids that may either be the aliphatic adipic acid or the aromatic terephthalic acid. When the aromatic dicarboxylic acid is terephthalic acid, the amide linkages on either side of the aromatic dicarboxylic acid are *both* attached to an aromatic ring as demonstrated in the polyamide 6,T example above. Therefore, increasing the amount of aromatic monomer in a copolyamide comprising aromatic monomer disclosed by Jadamus as suggested by Pallmer clearly increases the number of amide groups attached to aromatic rings.

It is not necessary for Pallmer to describe the effect of varying the level of amide groups attached to aromatic rings as asserted by the appellant, because the benefit of increasing the amount of aromatic monomers described by Pallmer *results in the same*

composition having the same features of amide groups attached to aromatic rings as claimed by the appellant. Furthermore, it is noted by the examiner that the appellant's specification fails to disclose any criticality to the recitation of "at least 50% of the amide groups attached to aromatic rings" since the appellant only provides example compositions in which *all* of the amide groups are attached to aromatic rings.

The appellant argues on page 5 of the remarks that "the Examiner has not established, or even argued, that varying the amount of aromatic monomers present in the polyamide bears any connection to the percentage of amide groups attached to aromatic rings in the chemical structure of aromatic polyamide" and that the claimed feature "makes no reference to the percentage of aromatic monomers present in the polyamide". As has been clearly demonstrated above and in the previous rejections, these assertions have no basis in basic polyamide polymer chemistry. Since polyamide is a condensation polymer, the amount of aromatic terephthalic acid monomers present in an aromatic copolyamide such as that taught by Jadamus bears a direct, inextricable connection to the amount of amide groups attached to aromatic rings in the chemical structure of an aromatic copolyamide. Pallmer provides a clear motivation for one of ordinary skill in the art to increase the amount of aromatic monomer in order to increase the stiffness of the aromatic copolyamide disclosed by Jadamus. Therefore, the appellant's assertions are not found persuasive.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Michele L Jacobson/

Examiner, Art Unit 1782

Conferees:

/Rena L. Dye/
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/SHRIVE BECK/

Supervisory Patent Examiner, Art Unit 1700